

A taxonomic update of *Brachyloma* (Ericaceae: Epacridoideae: Styphelioideae) in Western Australia

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Abstract

Hislop, M. & Cranfield, R.J. A taxonomic update of *Brachyloma* (Ericaceae: Epacridoideae: Styphelioideae) in Western Australia. *Nuytsia* 28: 303–316. Three new Western Australian species of *Brachyloma* Sond., *B. djerral* Cranfield & Hislop, *B. elusum* Hislop & Cranfield and *B. pirara* Cranfield & Hislop, are described and illustrated. All three are of conservation concern. A new combination, *B. geissoloma* (F.Muell.) Cranfield, is published to replace the illegitimate name *B. concolor* F.Muell. ex Benth. The following manuscript names are synonymised: *B. ericoides* subsp. *occidentale* Cranfield ms, *B. geissoloma* subsp. *collinum* Cranfield ms, *B. geissoloma* subsp. *ovatum* Cranfield ms and *B. moolya* Cranfield ms under *B. geissoloma*; *B. jillup* Cranfield ms, *B. preissii* subsp. *lanceolatum* Cranfield ms, *B. preissii* subsp. *obtusifolium* Cranfield ms and *B. tamminense* Cranfield ms under *B. preissii* Sond. A lectotype is designated for *B. preissii*. An updated key to the Western Australian species of *Brachyloma* is provided.

Introduction

Recent molecular research (Puente-Lelièvre *et al.* 2016) has supported the monophyly of the small epacrid genus *Brachyloma* Sond. Parsimony and Bayesian analyses of DNA sequence data produced a phylogenetic tree that showed a sister relationship between the genus and a clade comprising the genera *Conostephium* Benth. and *Stenanthera* R.Br. Within *Brachyloma* the species sampled were divided between two well-supported subclades that corresponded with Bentham's (1868) sections: the type section (which he referred to as sect. *Lobopogon* (Schltdl.) Benth. *nom. illeg.*) and sect. *Lissanthoides* Benth. As discussed in a previous paper (Hislop & Cranfield 2014) this dichotomy is generally well corroborated by morphological differences and there is a growing case for elevating the sections to generic level. The distribution of species from the two sections shows a distinct geographical bias, with most members of the type section from Western Australia, and the majority of those from sect. *Lissanthoides*, eastern Australian.

The current paper updates the taxonomy of the genus in Western Australia, providing formal names for the remaining well-defined taxa, while synonymising a number of manuscript names. The latter had been applied by the second author to putative segregates from a difficult species complex involving *B. preissii* Sond. and *B. geissoloma* (F.Muell.) Cranfield.

The three species described below bring to sixteen the number of currently accepted, published species in the genus. Of the ten Western Australian species, only two, *B. baxteri* (DC.) Puente-Lel.

and *B. stenolobum* Hislop & Cranfield, belong to sect. *Lissanthoides*; the remainder are from the type section.

Methods

This study was based on an examination of dried specimens housed at the Western Australian Herbarium (PERTH), together with field observations of the species described and their relatives in Western Australia.

Foliar measurements and observations were taken from dried specimens in natural posture. Care was taken to confine observations to mature leaves. Inflorescence length was measured from the point of attachment at the axil to flower base. Floral measurements were taken from rehydrated flowers in natural posture, with the exception of the corolla lobes which were uncurled to their fullest length before measuring.

Type specimens were obtained on loan from MEL. Scans of other relevant types were viewed via *Global Plants* (<http://plants.jstor.org/>).

Bioregions and subregions referred to in the text and shown on distribution maps follow *Interim Biogeographic Regionalisation for Australia* (IBRA) v. 7 (Department of the Environment 2013).

Notes on the *Brachyloma preissii*–*B. geissoloma* complex

Brachyloma preissii and *B. geissoloma* are closely related species, the two occupying a sister relationship in a recently published phylogenetic tree (Puente-Lelièvre *et al.* 2016). They have in common a distinctive stamen morphology that is characterised by broad, fleshy filaments and anthers that are well-exserted from the corolla tube. In addition they have a distinctive, longitudinally grooved, fruiting endocarp. The eastern Australian species, *B. ericoides* (Schltdl.) Sond., shares these attributes, but with the filaments even wider and rather thinner in texture. On this basis it seems likely that *B. preissii* and *B. geissoloma* are more closely related to *B. ericoides* than to the other western members of the genus.

Brachyloma preissii (plus the very similar *B. mogin* Cranfield) and *B. geissoloma* differ most obviously in leaf curvature; adaxially convex in the former and concave in the latter. Specimens now assigned to these species (more than 250 at PERTH) vary considerably in leaf size and shape, and, to some extent, in the size of floral parts and peduncle length. However, the identification of consistent floral or fruiting differences that might correlate with the foliar characters has so far proved to be a stumbling block to taxonomic progress in the group.

The *B. preissii*–*B. geissoloma* complex was examined as part of wider research into the taxonomy of the genus undertaken by the second author in the late 1990s and early 2000s. This resulted in the publication of one new species, *B. mogin* (Cranfield 2005), and a proposal for another eight taxa (*B. ericoides* subsp. *occidentale* Cranfield ms, *B. geissoloma* subsp. *collinum* Cranfield ms, *B. geissoloma* subsp. *ovatum* Cranfield ms, *B. jillup* Cranfield ms, *B. moolya* Cranfield ms, *B. preissii* subsp. *lanceolatum* Cranfield ms, *B. preissii* subsp. *obtusifolium* Cranfield ms and *B. tamminense* Cranfield ms). However, the putative taxonomic boundaries between these segregates have not held up to scrutiny of the increased numbers of collections that are now housed at PERTH. For this reason the names are synonymised below either under *B. preissii* or *B. geissoloma*, depending on their leaf curvature, as indicated above. It is now recognised that it will be necessary to undertake further targeted research, in order to more

satisfactorily delimit taxa within the complex. The question of whether *B. mogin* can be retained as a species distinct from *B. preissii*, and if so with what circumscription, will need to be considered as part of any future study. For the time being the name is retained for plants with relatively small and tightly recurved leaves.

Taxonomy

Key to the Western Australian species of *Brachyloma*

1. Corolla red or white; lobes narrowly triangular, acute, adaxially keeled in the upper half, strongly papillate or shortly hairy, at least about the keel (sect. *Lissanthoides*)
2. Corolla red; tube > 10 mm long; 5 hairy appendages inserted close to the base of the corolla tube (Lake Muir–Fitzgerald River)..... **B. baxteri**
- 2: Corolla white; tube to 1.6 mm long; appendages lacking from corolla tube, 5 hair tufts reflexed into the tube from the lobe bases (Forrestania area)..... **B. stenolobum**
- 1: Corolla red; lobes ovate or broadly ovate, usually obtuse, very occasionally subacute or acute, adaxial surface flat, appearing glabrous, but usually minutely papillose under magnification (sect. *Brachyloma*)
3. Anthers partially included within the corolla tube; filaments absent or short and inconspicuous, to c. 0.4 mm long
4. Leaves flat or adaxially convex, less often adaxially concave, if convex then the margins not prominently recurved and the abaxial surface always visible, apex long-mucronate and sharply pungent; sepals at least 2 mm long
5. Leaf margins coarsely ciliate with stiff hairs 0.08–0.20 mm long; sepals 3.0–3.6 mm long; style poorly differentiated from ovary apex, to 0.55 mm long; drupe globose, about as long as wide (Whicherina–East Binu–Kalbarri NP)..... **B. pirara**
- 5: Leaf margins usually with minute projections to c. 0.02 mm long, or occasionally ± smooth; sepals 2.0–2.4 mm long; style well-differentiated from ovary apex, 1.0–2.2 mm long; drupe depressed-ovate, much wider than long (Ajana–Nerren Nerren)..... **B. djerral**
- 4: Leaves always strongly convex adaxially, the margins recurved or revolute, partially obscuring the abaxial surface in some or all leaves, apex short- or long-mucronate, but not pungent; sepals to 1.5 mm long
6. Anthers exerted from the corolla tube by 1/8–1/4 of their length, sessile; style poorly differentiated from ovary apex, to 0.5 mm long; leaves 0.5–1.2 mm wide
7. Longest leaves to c. 8.0 mm long, including petiole; abaxial surface with deep, narrow grooves (Kulin area) **B. delbi**
- 7: Longest leaves to c. 5.5 mm long, but usually < 5.0 mm, including petiole; abaxial grooves shallower and wider than above (Newdegate–Forrestania–Cascade) **B. nguba**
- 6: Anthers exerted from the corolla tube by 1/2–2/3 of their length, with short filaments 0.2–0.4 mm long; style clearly differentiated from ovary apex, 1.3–2.0 mm long; leaves 1.0–2.0 mm wide (NE of Naremben–Hyden)..... **B. elusum**
- 3: Anthers fully exerted from corolla tube; filaments conspicuous, concavo-convex or less often plano-convex in section, fleshy, tapering at both ends, at least 1 mm long
8. Leaves adaxially concave..... **B. geissoloma s. lat.¹**

- 8: Leaves adaxially convex, usually with recurved margins but sometimes \pm flat..... **B. preissii s. lat.** (including **B. mogin**)¹

¹*Brachyloma preissii* and *B. geissoloma* together constitute an unresolved species complex (refer to notes above) that requires further study.

Descriptions of new species

Brachyloma djerral Cranfield & Hislop, *sp. nov.*

Typus: [north-east of Kalbarri], Western Australia [precise locality withheld for conservation reasons], 8 June 2005, *M. Hislop* 3459 (*holo*: PERTH 07011571; *iso*: CANB, K, MEL, NSW).

Brachyloma djerral Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma sp. Murchison (A.P. Brown 312), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Erect, compact *shrubs* to *c.* 1.2 m high and 1.2 m wide, multi-stemmed from the base of the plant, but probably with a fire-sensitive rootstock. Young *branchlets* with a sparse indumentum of very short, patent hairs to *c.* 0.05 mm long, or sometimes \pm glabrous. *Leaves* variously orientated from shallowly retrorse to steeply antrorse; apex long-mucronate, pungent, the mucro 0.4–0.8 mm long; base cuneate to rounded; petiole well-defined, 0.4–1.0 mm long, shortly hairy throughout or abaxial surface glabrous; lamina narrowly obovate to narrowly elliptic, 4–7 mm long, 1.4–2.4 mm wide, usually adaxially convex and the margins \pm recurved or less often \pm flat, longitudinal axis straight for most of its length, but usually gently recurved towards the apex; surfaces glaucous, markedly discolorous, glabrous except sometimes for a few basal hairs on either surface; adaxial surface becoming shiny through abrasion, venation not evident; abaxial surface paler, with 5–7 primary veins, \pm flat or broadly and shallowly grooved between the veins; margins usually with minute, coarse projections < 0.05 mm long or occasionally \pm glabrous. *Inflorescence* erect, upper-axillary; axis 0.8–1.3 mm long, 1-flowered, moderately hairy, terminating in the flower, bud-like rudiment absent. *Fertile bracts* very variable in size, ovate to depressed-ovate, 0.2–0.8 mm long, 0.2–0.6 mm wide, subtended by 7–10 sterile bracts. *Bracteoles* broadly ovate to depressed-ovate, 1.0–1.8 mm long, 1.3–1.9 mm wide, obtuse; abaxial surface glabrous, \pm striate; margins ciliolate. *Sepals* ovate to broadly ovate, 2.0–2.4 mm long, 1.5–2.2 mm wide, obtuse; abaxial surface glabrous, greenish, becoming red towards margins, \pm striate with 7–9 slightly raised veins; adaxial surface glabrous; margins densely ciliolate with hairs 0.03–0.08 mm long. *Corolla tube* red, ellipsoid or broadly ellipsoid, sometimes obovoid, much exceeding the sepals, 3.2–4.5 mm long, 2.8–3.5 mm wide, glabrous externally, internal surface glabrous apart from 5 reflexed, hairy appendages inserted at the apex; appendages 1.2–1.8 mm long, 0.7–1.2 mm wide with hairs 0.2–0.7 mm long concentrated on the margins but with a few often present on both surfaces. *Corolla lobes* red, ovate to broadly ovate, shorter than the tube, 1.8–2.7 mm long, 1.4–2.3 mm wide, imbricate basally, obtuse, flat adaxially, erect basally, recurved in the upper half, with margins often sparsely and irregularly ciliolate, glabrous externally, internal surface minutely papillose. *Anthers* yellow, partially exserted from the tube (by 1/3–1/2 of their length), 1.0–1.6 mm long, the lateral surfaces papillose, apex shallowly emarginate. *Filaments* very short and broad-based, to *c.* 0.2 mm long or \pm obsolete, attached 1/2–2/3 above anther base. *Nectary* annular, 0.4–0.5 mm long, irregularly lobed for 1/4–1/2 of its length. *Ovary* depressed-globose, 0.9–1.3 mm long, 1.2–1.8 mm wide, glabrous, 4- or less often 5-locular. *Style* 1.0–2.2 mm long, glabrous, well-differentiated from ovary apex, included within the corolla tube; stigma not expanded. *Fruit* strongly depressed-ovoid, much

longer than calyx, 3.0–6.0 mm long, 5.0–7.5 mm wide, glabrous, often \pm angular at maturity; surface rugose; style usually persistent. (Figures 1, 2A)

Diagnostic characters. Distinguished from all other members of the genus by the following character combination: very short, sparse branchlet indumentum to *c.* 0.05 mm long; leaf margins with very short, coarse projections; sepals much shorter than the corolla tube; anthers partially exserted from the corolla tube; filaments very short and broad-based or \pm obsolete; style well-differentiated from the ovary apex and 1.0–2.2 mm long; fruit strongly depressed-ovoid.

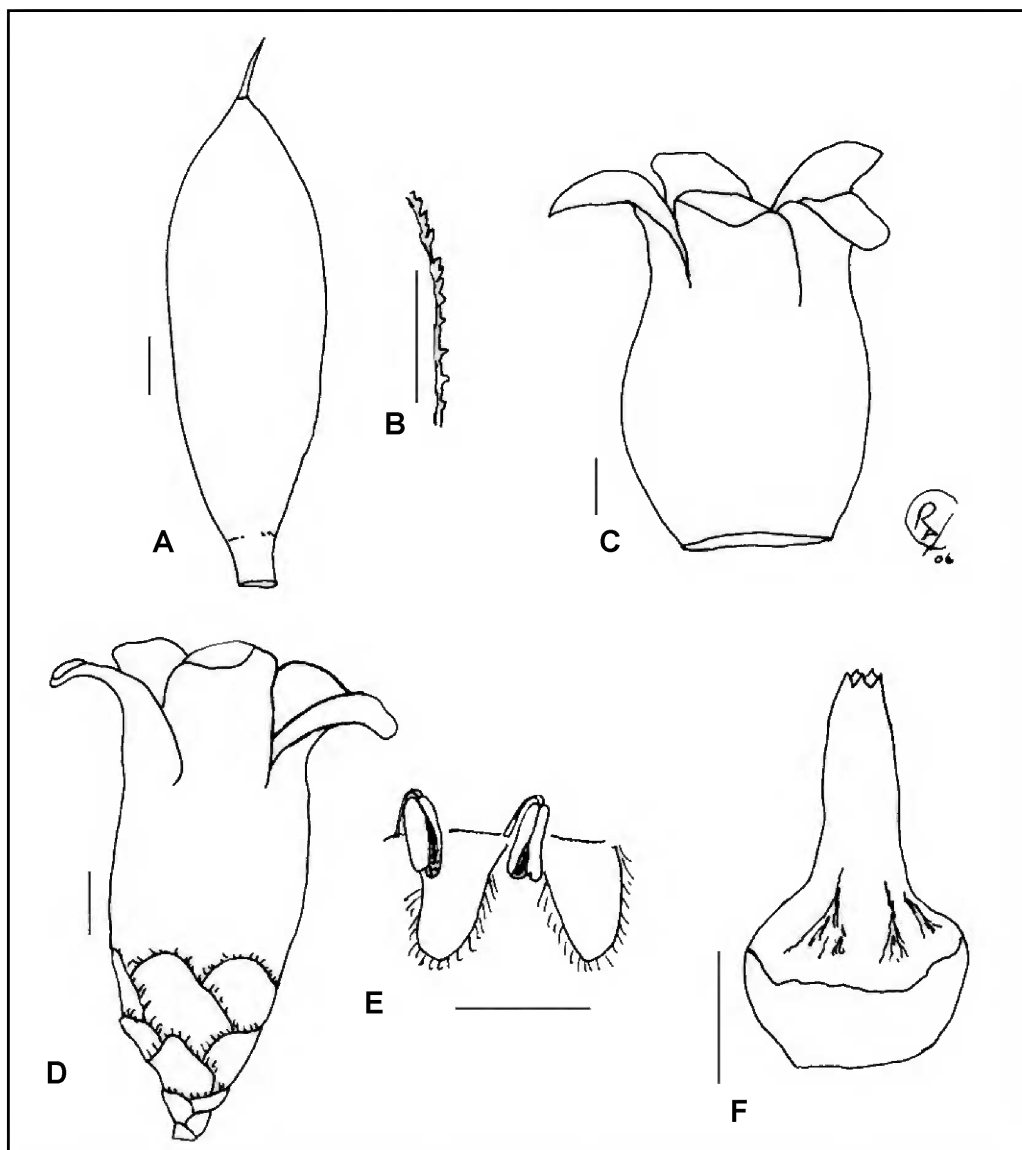


Figure 1. *Brachyloma djerral*. A – leaf; B – detail of leaf margin; C – corolla, external view; D – flower, including bracts, bracteoles and sepals; E – internal corolla tube, part of upper portion showing two anthers and two reflexed appendages; F – gynoecium. Scale bars = 1 mm. Drawn by Ray Cranfield from M. Hislop 3468.

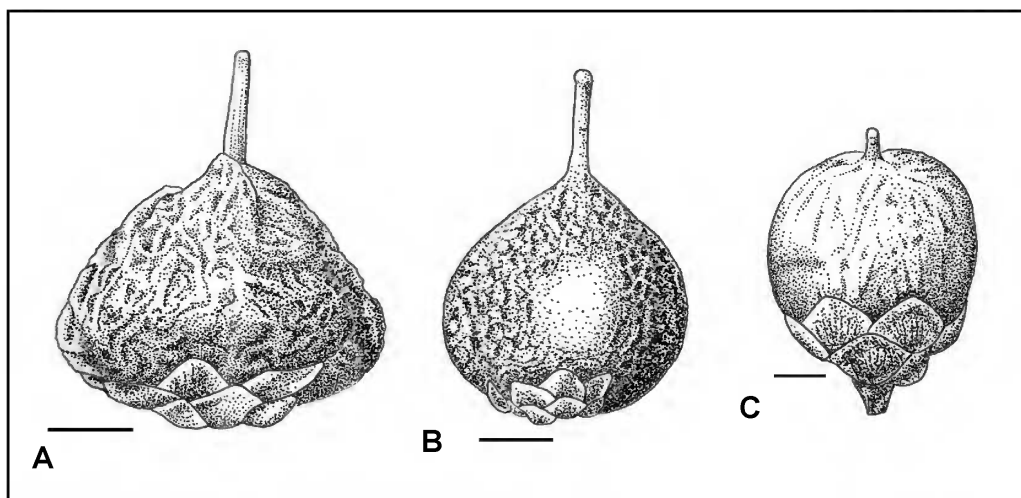


Figure 2. *Brachyloma* fruits. A – *B. djerral*; B – *B. elusum*; C – *B. pirara*. Scale bars = 2 mm. Drawn by Skye Coffey from M. Hislop 3448 (A), A.S. George 7877 (B), M. Hislop 4635 (C).

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 7 Aug. 1986, A.P. Brown 312 (PERTH); 30 Aug. 1990, A.H. Burbidge 4504 (PERTH); 8 June 2005, M. Hislop 3456 (PERTH); 8 June 2005, M. Hislop 3457 (CANB, K, MEL, PERTH); 8 June 2005, M. Hislop 3462 (CANB, NSW, PERTH); 9 June 2005, M. Hislop 3468 (CANB, PERTH); 9 June 2005, M. Hislop 3469 (CANB, PERTH); 4 Aug. 1996, G.J. Keighery & N. Gibson 1829 (CANB, PERTH); 6 Sep. 1966, R.V. Smith 66/302 (MEL, PERTH).

Distribution and habitat. Apparently confined to an area between Ajana and Nerren Nerren in the Geraldton Hills sub-region of the Geraldton Sandplains bioregion and the immediately adjoining parts of the Yalgoo bioregion (Figure 3). The species is restricted to yellow sandplain where it grows in low, open woodland and heath communities. Commonly associated species include *Eucalyptus eudesmoides*, *E. oldfieldii*, *Banksia sceptrum*, *Callitris arenarius* and *Allocasuarina campestris*.

Phenology. In average seasonal conditions peak flowering is likely to be between May and July, although there are indications that the species may flower sporadically at other times of the year. A mostly-fruited collection made in September has a few flowers present, and a couple of specimens collected in June, although more or less in full flower, also have some mature fruit.

Etymology. The epithet is from the Noongar language of the traditional inhabitants of the area (*djerral*, meaning the north: Bindon & Chadwick 1992), a reference to the northern distribution of this species.

Conservation status. Recently listed as Priority Three under Conservation Codes for Western Australian Flora (Western Australian Herbarium 1998–). Although occurring in a part of the state in which there are still large areas of more or less intact vegetation, *B. djerral* is geographically restricted. There is one record from the north-east of Kalbarri National Park, and the species is also known to be present at Eurardy Reserve, a privately owned and managed conservation reserve adjacent to Kalbarri National Park. The remaining collections are from Unallocated Crown Land or pastoral lease. Populations of the species tend to consist of scattered plants and it is not known to be locally common anywhere.

Affinities. The phylogenetic tree of Puente-Lelièvre *et al.* (2016) showed a well-supported sister

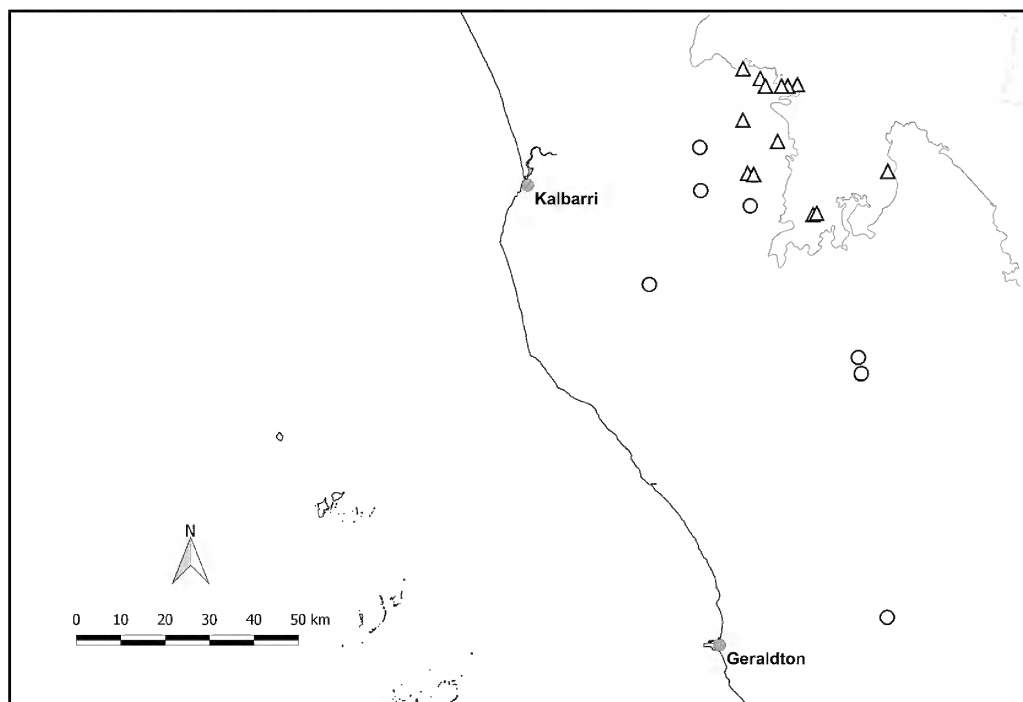


Figure 3. Distribution of *Brachyloma djerral* (Δ) and *B. pirara* (\circ) in the central west coast area of Western Australia.

relationship between *B. djerral* and *B. pirara* Cranfield & Hislop, described below. These species grow in very similar habitat in the same area of the Geraldton Sandplains bioregion; however, the two are morphologically quite distinct with many significant differences between them. Rather unusually among closely related epacrids, they can even be distinguished on the basis of their vegetative indumentum. Whereas *B. djerral* has a very short, sparse branchlet indumentum (hairs to c. 0.05 mm long) and leaf margins with minute projections (to c. 0.02 mm long), in *B. pirara* the indumentum is much longer and denser (hairs to 0.1–0.7 mm long) and the leaf margins are coarsely ciliate with hairs 0.08–0.20 mm long. In terms of floral and fruiting characters there are significant differences in the style (well-differentiated from the ovary apex and 1.0–2.2 mm long in *B. djerral*, cf. poorly differentiated and 0.35–0.55 mm long in *B. pirara*) and fruit shape (strongly depressed-ovate in *B. djerral* and globose in *B. pirara*). Other easily discernible differences between them include the shorter sepals of *B. djerral* (2.0–2.4 mm long cf. 3.0–3.6 mm), and obtuse (*B. djerral*) rather than acute or subacute (*B. pirara*) corolla lobes.

Despite the shared habitat preference and overlapping distributions of these two northern species, there are no records of them growing sympatrically.

Brachyloma elusum* Hislop & Cranfield, *sp. nov.

Typus: east of Hyden, Western Australia [precise locality withheld for conservation reasons], 24 April 2016, M. Hislop 4595 (*holo*: PERTH 08753016; *iso*: CANB, MEL, NSW).

Erect, compact *shrubs* to c. 80 cm high and 80 cm wide, multi-stemmed from the base of the plant, but probably with a fire-sensitive rootstock. Young *branchlets* with a sparse to moderately dense indumentum of short, patent or shallowly antrorse hairs to c. 0.08 mm long. *Leaves* variously antrorse;

apex obtuse to acute, with a short, slightly recurved, blunt mucro, 0.1–0.3 mm long; base attenuate to cuneate; petiole well-defined, 0.7–1.1 mm long, sparsely hairy throughout or the abaxial surface glabrous; lamina linear or very narrowly obovate, 4.2–7.5 mm long, 1.0–2.0 mm wide, strongly convex with the margins recurved to revolute, longitudinal axis \pm straight; surfaces glaucous, markedly discolorous; adaxial surface slightly shiny, \pm glabrous or with a few short antrorse hairs, venation not evident; abaxial surface paler with 5–7 primary veins, broadly and shallowly grooved, with very short, appressed, scurfy hairs between the veins; margins with minute, coarse, antrorse projections, <0.05 mm long. *Inflorescence* erect to spreading, axillary; axis 0.9–1.8 mm long, 1-flowered, moderately hairy, terminating in a very obscure bud-like rudiment that is completely concealed by the subtending bracts, or bud-like rudiment absent. *Fertile bracts* broadly ovate, 0.4–0.6 mm long, 0.4–0.6 mm wide, subtended by 7 or 8 sterile bracts. *Bracteoles* depressed-ovate, 0.7–1.0 mm long, 0.9–1.1 mm wide, obtuse; abaxial surface glabrous; margins ciliate. *Sepals* broadly ovate to depressed-ovate, 1.0–1.5 mm long, 1.0–1.5 mm wide, obtuse; abaxial surface glabrous, greenish, often with red tinges towards the margins, venation rather inconspicuous; adaxial surface glabrous; margins minutely ciliate, with hairs <0.02 mm long. *Corolla tube* red, ovoid to ellipsoid, much exceeding the sepals, 2.4–3.5 mm long, 1.9–3.0 mm wide, glabrous externally, internal surface with 5 reflexed, hairy appendages inserted at the apex; appendages 0.6–0.9 mm long, 0.3–0.5 mm wide, scarcely tapering to an obtuse apex, adnate to the tube for most or all of their length, with hairs 0.3–0.7 mm long concentrated on the margins, often with decurrent lines of hairs extending from the base of the appendages to the top of the tube behind the point of filament attachment. *Corolla lobes* red, ovate, shorter than the tube, 1.8–2.2 mm long, 1.3–1.8 mm wide, imbricate basally, obtuse, flat adaxially, erect basally, recurved in the upper half with \pm glabrous margins, glabrous externally, internal surface minutely papillose. *Anthers* yellow, partially exerted from the tube (by $1/2$ – $2/3$ of their length), 0.8–1.5 mm long, the lateral surfaces papillose, apex \pm entire to shallowly emarginate. *Filaments* short, thick, compressed, the free portion 0.2–0.4 mm long, attached *c.* $1/2$ above anther base with a broad, decurrent connective. *Nectary* annular, 0.2–0.4 mm long, \pm entire to deeply lobed. *Ovary* ovate to globose, 1.0–1.1 mm long, 0.8–1.0 mm wide, glabrous, (3)4-locular. *Style* 1.3–2.0 mm long, minutely papillose towards the apex, well-differentiated from ovary apex, included within the corolla tube; stigma not or scarcely expanded. *Fruit* broadly ovoid, much longer than calyx, 4.5–6.0 mm long, 4.5–6.0 mm wide, glabrous, surface rugose; style usually persistent. (Figures 2B, 4)

Diagnostic characters. Distinguished from all other members of the genus by the following character combination: recurved to revolute leaf margins; sepals much shorter than the corolla tube; anthers partially exerted from the corolla tube; filaments short, 0.2–0.4 mm long; style well-differentiated from the ovary apex and 1.3–2.0 mm long; fruit broadly ovoid.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 15 June 2005, *C. Hancock s.n.* (PERTH 08383685); 11 July 2004, *M. Hislop* 3262 (PERTH); 12 Sep. 2016, *M. Hislop* 4635 (CANB, PERTH).

Distribution and habitat. Known from two localities, one north-east of Narembreen, the other east of Hyden in the Avon Wheatbelt and Mallee bioregions respectively. At both localities the species is growing on yellow sandy soils with granite at depth, and the associated vegetation is tall heathland dominated by *Allocasuarina campestris* and *Melaleuca* spp.

Phenology. Flowering collections have been made between April and July, with the onset of flowering probably determined by the pattern of local rainfall in the late summer and autumn months. The only collection with mature fruit was made in September.



Figure 4. Photographs of post-flowering branchlets of *Brachyloma elusum* and *B. nguba* with corollas shed, giving a comparison of leaf character, peduncle and style length. A – *B. elusum*, from M. Hislop 4595; B – *B. nguba*, from L. Silvester & R. Buehrig s.n. Scale bar = 1 cm.

Etymology. *Elusus* is past participle of the Latin verb *eludo* (avoid, evade), a reference to elusive nature of this species and the difficulty to date, of finding new populations.

Conservation status. To be listed as Priority Two under Conservation Codes for Western Australian Flora (M. Smith pers. comm.). Currently known from two populations, about 80 km apart, one from a water reserve and the other in a nature reserve. At the northern locality only a single plant was noted at the time of collection. The population east of Hyden occurs in a nature reserve and consists of at least several dozen plants scattered over a wide area. There are significant tracts of uncleared vegetation remaining in this general area, including a number of reserves, and so the chances of finding new populations still appear good.

Affinities. In its stamen character, short sepals and recurved leaf margins *B. elusum* is most similar to *B. nguba* Cranfield. At the northern edge of its range the latter species is known to occur only about 30 km to the east of the Hyden population of *B. elusum*. As indicated in the key, there are several significant differences between them and the two should not be confused, at least under magnification. In the field they are distinguishable on the basis of the noticeably wider leaves of *B. elusum* (1.0–2.0 mm vs 0.5–1.2 mm but usually less than 1 mm in *B. nguba*) and longer inflorescence axis of *B. elusum* (0.9–1.8 mm long vs 0.5–0.7 mm).

Brachyloma pirara Cranfield & Hislop, *sp. nov.*

Typus: north-east of Northampton, Western Australia [precise locality withheld for conservation reasons], 7 June 2005, *M. Hislop* 3448 (*holo*: PERTH 07011539; *iso*: CANB, MEL, NSW).

Brachyloma pirara Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma sp. Kalbarri (A.H. Burbidge 4505), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017]

Erect, compact *shrubs* to c. 60 cm high and 60 cm wide, multi-stemmed from the base of plant, but probably with a fire-sensitive rootstock. Young *branchlets* with a moderately dense to dense indumentum of variously orientated hairs of mixed lengths, 0.1–0.7 mm long. *Leaves* variously orientated from shallowly retrorse to steeply antrorse; apex long-mucronate, pungent, the mucro 0.5–1.0 mm long; base cuneate or sometimes rounded; petiole well-defined, 0.4–0.8 mm long, usually sparsely hairy at least on the adaxial surface; lamina narrowly obovate to narrowly elliptic (occasionally narrowly ovate), 5.0–8.0 mm long, 1.2–2.2 mm wide, curvature varying from slightly concave adaxially to slightly convex, longitudinal axis \pm straight; surfaces glaucous, markedly discolorous, glabrous or sparsely scabrous with short, coarse hairs on either surface; adaxial surface becoming shiny through abrasion, venation not evident; abaxial surface paler, with 5–7 primary veins, flat between the veins; margins coarsely ciliate with hairs 0.08–0.20 mm long. *Inflorescence* erect, axillary; axis 0.7–1.2 mm long, 1-flowered, glabrous or sparsely hairy, terminating in the flower, bud-like rudiment absent. *Fertile bracts* very variable in size, broadly ovate to depressed-ovate, 0.3–1.2 mm long, 0.3–1.0 mm wide, subtended by 7–11 sterile bracts. *Bracteoles* broadly ovate to depressed-ovate, 1.8–2.8 mm long, 1.7–2.5 mm wide, obtuse; abaxial surface glabrous, \pm striate; margins ciliolate. *Sepals* broadly ovate to ovate, 3.0–3.6 mm long, 2.0–2.7 mm wide, obtuse; abaxial surface glabrous, greenish or straw-coloured, becoming red towards margins, \pm striate with 7–9 slightly raised veins; adaxial surface glabrous; margins ciliolate with hairs 0.02–0.05 mm long. *Corolla tube* red, obovoid or narrowly obovoid, exceeding the sepals, 3.6–4.6 mm long, 2.4–3.0 mm wide, glabrous externally, internal surface glabrous apart from 5 reflexed, hairy appendages inserted at the apex; appendages 2.0–2.8 mm long, 0.5–0.7 mm wide, with hairs 0.3–0.7 mm long on the margins and distal surfaces. *Corolla lobes* red, ovate or narrowly ovate, shorter than the tube, 2.6–3.5 mm long, 1.8–2.4 mm wide, imbricate basally, acute or subacute, flat adaxially, erect basally, recurved in the upper half, with margins often sparsely and irregularly ciliolate, glabrous externally, internal surface minutely papillose. *Anthers* yellow, partially exserted from the tube (by 1/8–1/4 of their length), 1.5–2.0 mm long, the lateral surfaces papillose, apex shallowly emarginate. *Filaments* very short and broad-based, the free portion to c. 0.3 mm long, attached c. 3/4 above anther base. *Nectary* annular, 0.35–0.55 mm long, with a jagged rim. *Ovary* ovoid, 1.2–1.5 mm long, 1.0–1.2 mm wide, glabrous, 3–5-locular (mostly 4-). *Style* 0.35–0.55 mm long, tapering smoothly from ovary apex and poorly differentiated at flowering, included within the corolla tube; stigma not expanded. *Fruit* much longer than calyx, globose to broadly ellipsoid, 5.0–6.0 mm long, 5.0–5.5 mm wide, glabrous; surface faintly rugose; style persistent. (Figures 2C, 5)

Diagnostic characters. Distinguished from all other members of the genus by the following character combination: relatively long and conspicuous branchlet indumentum 0.1–0.7 mm long; leaf margins conspicuously ciliate with coarse hairs 0.08–0.20 mm long; sepals shorter than the corolla tube; anthers partially exserted from the corolla tube; filaments very short and broad-based or \pm obsolete; style poorly differentiated from ovary apex, 0.35–0.55 mm long; fruit globose to broadly ellipsoid.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 9 Sep. 1990, *A.H. Burbidge* 4505 (PERTH); 17 July 1966, *A.C. Burns* 4 (PERTH); 18 Aug. 1974, *A.C. Burns* 16 (PERTH); 18 Aug. 1994, *R.J. Cranfield* 9332 (PERTH); 24 June 1997, *R. Davis* 3520 (PERTH); 15 May 1968, *H. Demarz* D73 (PERTH); 13 June 1976, *A.S. George* 14273 (PERTH); 13 May 1968, *P.G. Wilson* 6747 (CANB, PERTH).

Distribution and habitat. Occurs between Whicherina, East Binu and Kalbarri National Park in the Geraldton Hills sub-region of the Geraldton Sandplains bioregion (Figure 3). *Brachyloma pirara* is apparently restricted to yellow sandplains in low woodland or heath.

Phenology. Apparently very similar to *B. djerral*, with peak flowering between late autumn and mid-winter. Like that species it also appears to flower sporadically outside this period, probably depending on the pattern of recent local rainfall.

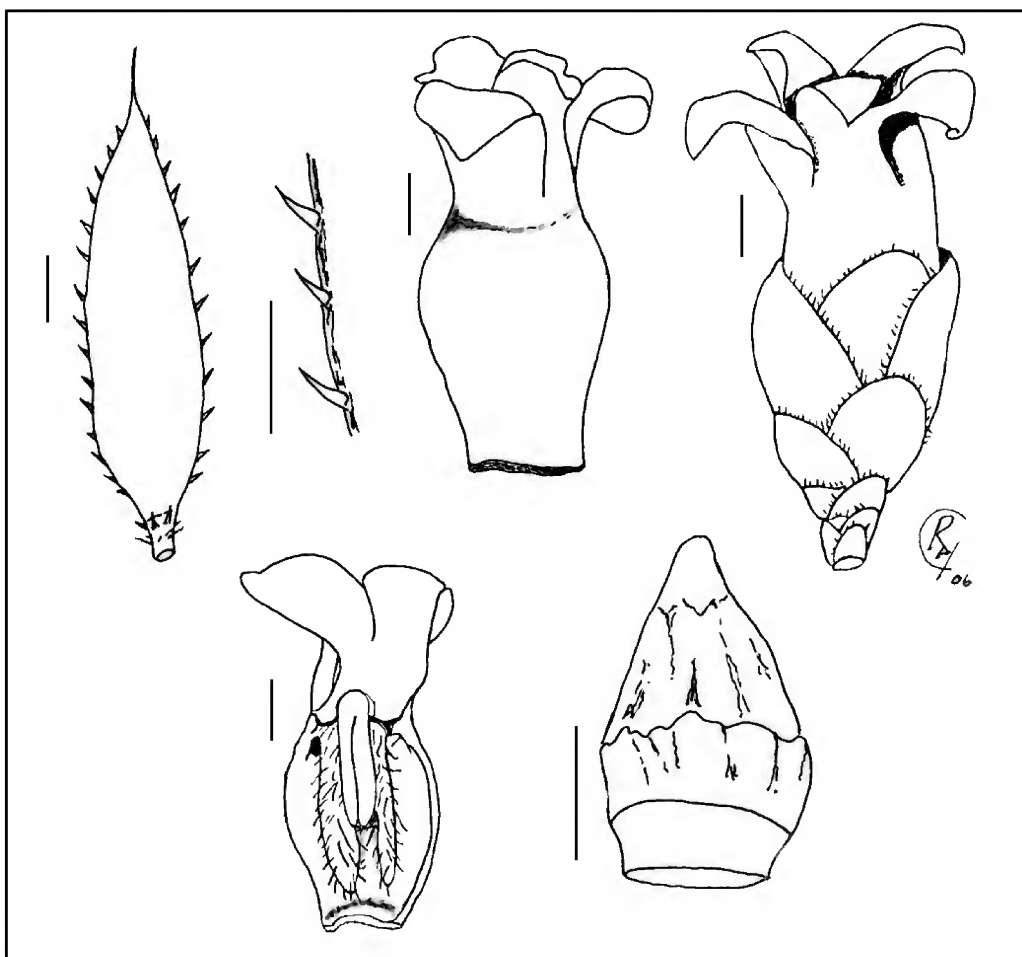


Figure 5. *Brachyloma pirara*. A – leaf; B – detail of leaf margin; C – corolla, external view; D – flower, including bracts, bracteoles and sepals; E – internal corolla tube, part of upper portion showing one anther and two reflexed appendages; F – gynoecium. Scale bars = 1 mm. Drawn by Ray Cranfield from *M. Hislop* 3448.

Etymology. From the Noongar language of the traditional inhabitants of the area, *pirara*, sand or sandy place (Bindon & Chadwick 1992), referring to the soil preference of this species.

Conservation status. Listed under its manuscript name as Priority Two under Conservation Codes for Western Australian Flora (Smith 2017). This species is poorly known, with just nine collections at PERTH, and only two of them made in the last 20 years. Within the conservation estate it has been recorded from the north-eastern part of Kalbarri National Park, south of Eurardy Reserve.

Affinities. *Brachyloma pirara* is one of two members of the genus that occur north of Geraldton and, according to recently published molecular data (Puente-Lelièvre *et al.* 2016), its closest relative is the other species from that area, *B. djerral*. The two are readily distinguished however, and the differences between them are discussed under the affinities heading for *B. djerral*.

The only other occurrence of the genus in the Geraldton Sandplains bioregion is from south of Geraldton where one or possibly two taxa from the *B. preissii*–*B. geissoloma* complex are distributed as far north as the Eneabba–Three Springs area. These can be readily separated from the two northern species by their short, innocuous leaf apices (*cf.* long-mucronate and pungent) and in having anthers that are fully exerted from the corolla tubes on long, fleshy filaments (*cf.* partially included on very short filaments in *B. pirara* and *B. djerral*).

A new combination, a lectotypification, and the synonymisation of eight manuscript names

Brachyloma geissoloma (F.Muell.) Cranfield, *comb. nov.*

Stenanthera brachyloma F.Muell., *Fragm.* 4(27): 99 (1864). *Cyathodes brachyloma* F.Muell., *Fragm.* 4(27): 99 (1864), *nom. inval.* *Styphelia geissoloma* F.Muell., *Fragm.* 6(42): 39 (1867). *Brachyloma concolor* F.Muell., *Fragm.* 6(42): 39 (1867), *nom. inval.* *Brachyloma concolor* F.Muell. ex Benth., *Fl. Austral.* 4: 172 (1868), *nom. illeg.* *Type:* ‘ad extremitatum occidentalem sinus Great Bight’ [south coast of Western Australia, east of Esperance], *G. Maxwell s.n.* (*syn:* MEL 2079293!, MEL 2079294!).

Brachyloma geissoloma subsp. *collinum* Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma geissoloma subsp. *ovatum* Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma ericoides subsp. *occidentale* Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma moolya Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Notes. This species was first published by Mueller (1864) as *Stenanthera brachyloma* F.Muell., at which time the author also listed the superfluous name *Cyathodes brachyloma* F.Muell. in synonymy. Later, still reluctant to use Sonder’s (1845) new generic name, Mueller (1867) described the species a second time as *Styphelia geissoloma* F.Muell., based on the same Maxwell type. On this occasion he added another superfluous name, *Brachyloma concolor* F.Muell., and included his earlier name, *Stenanthera brachyloma*, as a synonym. Bentham (1868) accepted *Brachyloma* as a good genus but

erred in taking up *B. concolor* as a valid name. The first published species epithet, *brachyloma*, is a tautonym and therefore cannot be used, leaving *geissoloma* as the next validly published name.

Brachyloma preissii Sond. in Lehm., *Pl. Preiss.* 1(2): 304 (1845). *Styphelia brachyloma* F.Muell., *Fragm.* 6(42): 39 (1867). *Type*: ‘In arenosis prope Bull’s-creek’ [Bull Creek, suburban Perth, Western Australia], November 1841, *J.A.L. Preiss s.n.* (*lecto*, here designated: MEL 0624586!); ‘Swan River’ [Western Australia], 1843, *J. Drummond* 480 (*syn*: MEL 0624587!, K 000356350 image seen, P 00760487 image seen).

Brachyloma preissii var. *brevifolium* Sond. in Lehm., *Pl. Preiss.* 1(2): 305 (1845). In regionibus interioribus Australiae meridionali-occidentalis [between York and Albany, Western Australia], October 1840, *L. Preiss* 426 (*syn*: MEL 0624588).

Brachyloma preissii subsp. *lanceolatum* Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma preissii subsp. *obtusifolium* Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma jillup Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Brachyloma tamminense Cranfield ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 7 July 2017].

Lectotypification. The Preiss collection from Sonder’s own herbarium, now at MEL, is here selected as lectotype. It was collected from what is today suburban Perth. It has the relatively large, convex leaves (*c.* 12–16 mm long and 2–3 mm wide) with short mucros (to *c.* 0.4 mm long) that are typical of the species on the Swan Coastal Plain, north and south of Perth.

The second collection cited by Sonder in his protologue, *Drummond* 480, has some unusual features for the species. The combination of long (*c.* 1 mm), very fine mucros and long (*c.* 4 mm) peduncles is seen in only a couple of specimens at PERTH, from the Darling Range north-east of Perth (e.g. *G.J. Keighery* 3963 from Clackline). Whether this morphotype should be regarded as conspecific with the form lectotypified here is a question that will need to be addressed when the taxonomy of the *B. preissii*–*geissoloma* complex is revisited.

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